SEQUENCE LISTING

<110> Glass, David J.
      Karow, Margaret
      Smith, Eric

<120> HIV-Specific Fusion Proteins and
      Therapeutic and Diagnostic Methods For Use

<130> REG 990A

<140> to be assigned
<141> 2004-01-30

<150> US 60/446,347
<151> 2003-02-10

<160> 18

<170> FastSEQ for Windows Version 4.0

<210> 1
<211> 446
<212> PRT
<213> Artificial Sequence

<220>
<223> Artificial Constructs

<400> 1
Asp Tyr Gln Val Ser Ser Pro Ile Tyr Asp Ile Asn Tyr Tyr Thr Ser
 1   5   10   15
Glu Pro Ser Gln Lys Ile Asn Val Lys Gln Ile Ala Ala Arg Leu Leu
            20   25   30
Thr Arg Gly Gly Ala Ile Ala Lys Lys Val Val Leu Gly Lys Lys Gly
        35   40   45
Asp Thr Val Glu Leu Thr Cys Thr Ala Ser Gln Lys Lys Ser Ile Gln
    50   55   60
Phe His Trp Lys Asn Ser Asn Gln Ile Lys Ile Leu Gly Asn Gln Gly
65   70   75   80
Ser Phe Leu Thr Lys Gly Pro Ser Lys Leu Asn Asp Arg Ala Asp Ser
            85   90   95
Arg Arg Ser Leu Trp Asp Gln Gly Asn Phe Pro Leu Ile Ile Lys Asn
            100   105   110
Leu Lys Ile Glu Asp Ser Asp Thr Tyr Ile Cys Glu Val Glu Asp Gln
        115   120   125
Lys Glu Glu Val Gln Leu Leu Val Phe Gly Leu Thr Ala Asn Ser Asp
    130   135   140
Thr His Leu Leu Gln Gly Gln Ser Leu Thr Leu Thr Leu Glu Ser Pro
145   150   155   160
Pro Gly Ser Ser Pro Ser Val Gln Cys Arg Ser Pro Arg Gly Lys Asn
            165   170   175
Ile Gln Gly Gly Lys Thr Leu Ser Val Ser Gln Leu Glu Leu Gln Asp
        180   185   190
Ser Gly Thr Trp Thr Cys Thr Val Leu Gln Asn Gln Lys Lys Val Glu

1

```
                195                       200                       205
Phe Lys Ile Asp Ile Val Val Leu Ala Ser Gly Asp Lys Thr His Thr
    210                       215                       220
Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe
225                       230                       235                       240
Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro
                245                       250                       255
Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu Val
                260                       265                       270
Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr
                275                       280                       285
Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr Arg Val Val Ser Val
    290                       295                       300
Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys
305                       310                       315                       320
Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser
                325                       330                       335
Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro
                340                       345                       350
Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val
    355                       360                       365
Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly
    370                       375                       380
Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp
385                       390                       395                       400
Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp
                405                       410                       415
Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His
    420                       425                       430
Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
    435                       440                       445


<210> 2
<211> 450
<212> PRT
<213> Artificial Sequence

<220>
<223> Artificial Constructs

<400> 2
Arg Ser Thr Arg Gly Gly Ala Ile Ala Lys Lys Val Val Leu Gly Lys
 1               5                       10                      15
Lys Gly Asp Thr Val Glu Leu Thr Cys Thr Ala Ser Gln Lys Lys Ser
            20                      25                      30
Ile Gln Phe His Trp Lys Asn Ser Asn Gln Ile Lys Ile Leu Gly Asn
        35                      40                      45
Gln Gly Ser Phe Leu Thr Lys Gly Pro Ser Lys Leu Asn Asp Arg Ala
    50                      55                      60
Asp Ser Arg Arg Ser Leu Trp Asp Gln Gly Asn Phe Pro Leu Ile Ile
65                      70                      75                      80
Lys Asn Leu Lys Ile Glu Asp Ser Asp Thr Tyr Ile Cys Glu Val Glu
                85                      90                      95
Asp Gln Lys Glu Glu Val Gln Leu Leu Val Phe Gly Leu Thr Ala Asn
            100                     105                     110
Ser Asp Thr His Leu Leu Gln Gly Gln Ser Leu Thr Leu Thr Leu Glu
```

2

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              115                    120                    125
Ser Pro Pro Gly Ser Ser Pro Ser Val Gln Cys Arg Ser Pro Arg Gly
    130                    135                    140
Lys Asn Ile Gln Gly Gly Lys Thr Leu Ser Val Ser Gln Leu Glu Leu
145                    150                    155                    160
Gln Asp Ser Gly Thr Trp Thr Cys Thr Val Leu Gln Asn Gln Lys Lys
                   165                    170                    175
Val Glu Phe Lys Ile Asp Ile Val Val Leu Ala Thr Arg Asp Tyr Gln
                   180                    185                    190
Val Ser Ser Pro Ile Tyr Asp Ile Asn Tyr Tyr Thr Ser Glu Pro Ser
                   195                    200                    205
Gln Lys Ile Asn Val Lys Gln Ile Ala Ala Arg Leu Leu Ser Gly Asp
    210                    215                    220
Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly
225                    230                    235                    240
Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile
                   245                    250                    255
Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser His Glu
                   260                    265                    270
Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val His
                   275                    280                    285
Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr Arg
    290                    295                    300
Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys
305                    310                    315                    320
Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu
                   325                    330                    335
Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr
                   340                    345                    350
Thr Leu Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser Leu
                   355                    360                    365
Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp
                   370                    375                    380
Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val
385                    390                    395                    400
Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp
                   405                    410                    415
Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His
                   420                    425                    430
Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro
    435                    440                    445
Gly Lys
450


<210> 3
<211> 436
<212> PRT
<213> Artificial Sequence

<220>
<223> Artificial Constructs

<400> 3
Asp Tyr Gln Val Ser Ser Pro Ile Tyr Asp Ile Asn Tyr Tyr Thr Ser
 1               5                  10                  15
Glu Pro Ser Gln Lys Ile Asn Val Lys Gln Ile Ala Ala Arg Leu Leu
```

3

```
                    20                      25                      30
Thr Arg Gly Gly Ala Ile Ala Thr Val Glu Leu Thr Cys Thr Ala Ser
            35                      40                      45
Gln Lys Lys Ser Ile Gln Phe His Trp Lys Asn Ser Asn Gln Ile Lys
        50                      55                      60
Ile Leu Gly Asn Gln Gly Ser Phe Leu Thr Lys Gly Pro Ser Lys Leu
65                      70                      75                      80
Asn Asp Arg Ala Asp Ser Arg Arg Ser Leu Trp Asp Gln Gly Asn Phe
                    85                      90                      95
Pro Leu Ile Ile Lys Asn Leu Lys Ile Glu Asp Ser Asp Thr Tyr Ile
            100                     105                     110
Cys Glu Val Glu Asp Gln Lys Glu Glu Val Gln Leu Leu Val Phe Gly
            115                     120                     125
Leu Thr Ala Asn Ser Asp Thr His Leu Leu Gln Gly Gln Ser Leu Thr
        130                     135                     140
Leu Thr Leu Glu Ser Pro Pro Gly Ser Ser Pro Ser Val Gln Cys Arg
145                     150                     155                     160
Ser Pro Arg Gly Lys Asn Ile Gln Gly Gly Lys Thr Leu Ser Val Ser
                165                     170                     175
Gln Leu Glu Leu Gln Asp Ser Gly Thr Trp Thr Cys Thr Val Leu Gln
            180                     185                     190
Asn Gln Lys Lys Val Glu Phe Lys Ile Asp Ile Val Val Leu Ala Ser
            195                     200                     205
Gly Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu
        210                     215                     220
Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu
225                     230                     235                     240
Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser
                245                     250                     255
His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val Glu
            260                     265                     270
Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr
        275                     280                     285
Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn
        290                     295                     300
Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Ala Pro
305                     310                     315                     320
Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln
                325                     330                     335
Val Tyr Thr Leu Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn Gln Val
            340                     345                     350
Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val
            355                     360                     365
Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro
        370                     375                     380
Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr
385                     390                     395                     400
Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val
                405                     410                     415
Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu
            420                     425                     430
Ser Pro Gly Lys
            435


<210> 4
<211> 621
```

<212> PRT
<213> Artificial Sequence

<220>
<223> Artificial Constructs

<400> 4
```
Asp Tyr Gln Val Ser Ser Pro Ile Tyr Asp Ile Asn Tyr Tyr Thr Ser
1               5               10              15
Glu Pro Ser Gln Lys Ile Asn Val Lys Gln Ile Ala Ala Arg Leu Leu
            20              25              30
Thr Arg Gly Gly Ala Ile Ala Lys Lys Val Val Leu Gly Lys Lys Gly
        35              40              45
Asp Thr Val Glu Leu Thr Cys Thr Ala Ser Gln Lys Lys Ser Ile Gln
    50              55              60
Phe His Trp Lys Asn Ser Asn Gln Ile Lys Ile Leu Gly Asn Gln Gly
65              70              75              80
Ser Phe Leu Thr Lys Gly Pro Ser Lys Leu Asn Asp Arg Ala Asp Ser
            85              90              95
Arg Arg Ser Leu Trp Asp Gln Gly Asn Phe Pro Leu Ile Ile Lys Asn
            100             105             110
Leu Lys Ile Glu Asp Ser Asp Thr Tyr Ile Cys Glu Val Glu Asp Gln
        115             120             125
Lys Glu Glu Val Gln Leu Leu Val Phe Gly Leu Thr Ala Asn Ser Asp
    130             135             140
Thr His Leu Leu Gln Gly Gln Ser Leu Thr Leu Thr Leu Glu Ser Pro
145             150             155             160
Pro Gly Ser Ser Pro Ser Val Gln Cys Arg Ser Pro Arg Gly Lys Asn
            165             170             175
Ile Gln Gly Gly Lys Thr Leu Ser Val Ser Gln Leu Glu Leu Gln Asp
        180             185             190
Ser Gly Thr Trp Thr Cys Thr Val Leu Gln Asn Gln Lys Lys Val Glu
        195             200             205
Phe Lys Ile Asp Ile Val Val Leu Ala Ser Gly Phe Gln Lys Ala Ser
    210             215             220
Ser Ile Val Tyr Lys Lys Glu Gly Glu Gln Val Glu Phe Ser Phe Pro
225             230             235             240
Leu Ala Phe Thr Val Glu Lys Leu Thr Gly Ser Gly Glu Leu Trp Trp
            245             250             255
Gln Ala Glu Arg Ala Ser Ser Ser Lys Ser Trp Ile Thr Phe Asp Leu
            260             265             270
Lys Asn Lys Glu Val Ser Val Lys Arg Val Thr Gln Asp Pro Lys Leu
        275             280             285
Gln Met Gly Lys Lys Leu Pro Leu His Leu Thr Leu Pro Gln Ala Leu
    290             295             300
Pro Gln Tyr Ala Gly Ser Gly Asn Leu Thr Leu Ala Leu Glu Ala Lys
305             310             315             320
Thr Gly Lys Leu His Gln Glu Val Asn Leu Val Val Met Arg Ala Thr
            325             330             335
Gln Leu Gln Lys Asn Leu Thr Cys Glu Val Trp Gly Pro Thr Ser Pro
        340             345             350
Lys Leu Met Leu Ser Leu Lys Leu Glu Asn Lys Glu Ala Lys Val Ser
        355             360             365
Lys Arg Glu Lys Ala Val Trp Val Leu Asn Pro Glu Ala Gly Met Trp
    370             375             380
Gln Cys Leu Leu Ser Asp Gly Ala Ser Gly Asp Lys Thr His Thr Cys
385             390             395             400
```

5

```
Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu
            405             410             415
Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu
            420             425             430
Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys
            435             440             445
Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys
        450             455             460
Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr Arg Val Val Ser Val Leu
465             470             475             480
Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys
            485             490             495
Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys
            500             505             510
Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
            515             520             525
Arg Asp Glu Leu Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
            530             535             540
Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln
545             550             555             560
Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly
            565             570             575
Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
            580             585             590
Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
            595             600             605
His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
    610             615             620


<210> 5
<211> 611
<212> PRT
<213> Artificial Sequence

<220>
<223> Artificial Constructs

<400> 5
Asp Tyr Gln Val Ser Ser Pro Ile Tyr Asp Ile Asn Tyr Tyr Thr Ser
 1               5               10              15
Glu Pro Ser Gln Lys Ile Asn Val Lys Gln Ile Ala Ala Arg Leu Leu
            20              25              30
Thr Arg Gly Gly Ala Ile Ala Thr Val Glu Leu Thr Cys Thr Ala Ser
        35              40              45
Gln Lys Lys Ser Ile Gln Phe His Trp Lys Asn Ser Asn Gln Ile Lys
    50              55              60
Ile Leu Gly Asn Gln Gly Ser Phe Leu Thr Lys Gly Pro Ser Lys Leu
65              70              75              80
Asn Asp Arg Ala Asp Ser Arg Arg Ser Leu Trp Asp Gln Gly Asn Phe
            85              90              95
Pro Leu Ile Ile Lys Asn Leu Lys Ile Glu Asp Ser Asp Thr Tyr Ile
            100             105             110
Cys Glu Val Glu Asp Gln Lys Glu Glu Val Gln Leu Leu Val Phe Gly
            115             120             125
Leu Thr Ala Asn Ser Asp Thr His Leu Leu Gln Gly Gln Ser Leu Thr
            130             135             140
```

6

```
Leu Thr Leu Glu Ser Pro Pro Gly Ser Ser Pro Ser Val Gln Cys Arg
145             150             155                 160
Ser Pro Arg Gly Lys Asn Ile Gln Gly Gly Lys Thr Leu Ser Val Ser
            165             170             175
Gln Leu Glu Leu Gln Asp Ser Gly Thr Trp Thr Cys Thr Val Leu Gln
        180             185             190
Asn Gln Lys Lys Val Glu Phe Lys Ile Asp Ile Val Val Leu Ala Ser
        195             200             205
Gly Phe Gln Lys Ala Ser Ser Ile Val Tyr Lys Lys Glu Gly Glu Gln
    210             215             220
Val Glu Phe Ser Phe Pro Leu Ala Phe Thr Val Glu Lys Leu Thr Gly
225             230             235                 240
Ser Gly Glu Leu Trp Trp Gln Ala Glu Arg Ala Ser Ser Ser Lys Ser
            245             250             255
Trp Ile Thr Phe Asp Leu Lys Asn Lys Glu Val Ser Val Lys Arg Val
            260             265             270
Thr Gln Asp Pro Lys Leu Gln Met Gly Lys Lys Leu Pro Leu His Leu
        275             280             285
Thr Leu Pro Gln Ala Leu Pro Gln Tyr Ala Gly Ser Gly Asn Leu Thr
        290             295             300
Leu Ala Leu Glu Ala Lys Thr Gly Lys Leu His Gln Glu Val Asn Leu
305             310             315                 320
Val Val Met Arg Ala Thr Gln Leu Gln Lys Asn Leu Thr Cys Glu Val
            325             330             335
Trp Gly Pro Thr Ser Pro Lys Leu Met Leu Ser Leu Lys Leu Glu Asn
            340             345             350
Lys Glu Ala Lys Val Ser Lys Arg Glu Lys Ala Val Trp Val Leu Asn
            355             360             365
Pro Glu Ala Gly Met Trp Gln Cys Leu Leu Ser Asp Gly Ala Ser Gly
    370             375             380
Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly
385             390             395                 400
Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met
            405             410             415
Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser His
            420             425             430
Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val
            435             440             445
His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr
    450             455             460
Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly
465             470             475                 480
Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile
            485             490             495
Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val
        500             505             510
Tyr Thr Leu Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser
        515             520             525
Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu
        530             535             540
Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro
545             550             555                 560
Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val
            565             570             575
Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met
            580             585             590
His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser
```

```
          595                    600                    605
Pro Gly Lys
     610


<210> 6
<211> 476
<212> PRT
<213> Artificial Sequence

<220>
<223> Artificial Constructs

<400> 6
Asp Tyr Gln Val Ser Ser Pro Ile Tyr Asp Ile Asn Tyr Tyr Thr Ser
 1               5                  10                  15
Glu Pro Ser Gln Lys Ile Asn Val Lys Gln Ile Ala Ala Arg Leu Leu
            20                  25                  30
Thr Arg Asp Tyr Gln Val Ser Ser Pro Ile Tyr Asp Ile Asn Tyr Tyr
        35                  40                  45
Thr Ser Glu Pro Ser Gln Lys Ile Asn Val Lys Gln Ile Ala Ala Arg
    50                  55                  60
Leu Leu Ala Ile Ala Lys Lys Val Val Leu Gly Lys Lys Gly Asp Thr
65                  70                  75                  80
Val Glu Leu Thr Cys Thr Ala Ser Gln Lys Lys Ser Ile Gln Phe His
                85                  90                  95
Trp Lys Asn Ser Asn Gln Ile Lys Ile Leu Gly Asn Gln Gly Ser Phe
            100                 105                 110
Leu Thr Lys Gly Pro Ser Lys Leu Asn Asp Arg Ala Asp Ser Arg Arg
            115                 120                 125
Ser Leu Trp Asp Gln Gly Asn Phe Pro Leu Ile Ile Lys Asn Leu Lys
    130                 135                 140
Ile Glu Asp Ser Asp Thr Tyr Ile Cys Glu Val Glu Asp Gln Lys Glu
145                 150                 155                 160
Glu Val Gln Leu Leu Val Phe Gly Leu Thr Ala Asn Ser Asp Thr His
                165                 170                 175
Leu Leu Gln Gly Gln Ser Leu Thr Leu Thr Leu Glu Ser Pro Pro Gly
            180                 185                 190
Ser Ser Pro Ser Val Gln Cys Arg Ser Pro Arg Gly Lys Asn Ile Gln
            195                 200                 205
Gly Gly Lys Thr Leu Ser Val Ser Gln Leu Glu Leu Gln Asp Ser Gly
    210                 215                 220
Thr Trp Thr Cys Thr Val Leu Gln Asn Gln Lys Lys Val Glu Phe Lys
225                 230                 235                 240
Ile Asp Ile Val Val Leu Ala Ser Gly Asp Lys Thr His Thr Cys Pro
                245                 250                 255
Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe
            260                 265                 270
Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val
            275                 280                 285
Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe
        290                 295                 300
Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro
305                 310                 315                 320
Arg Glu Glu Gln Tyr Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr
            325                 330                 335
Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val
```

8

```
                340                    345                    350
Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala
            355                    360                    365
Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg
        370                    375                    380
Asp Glu Leu Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly
385                    390                    395                    400
Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro
                405                    410                    415
Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser
                420                    425                    430
Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln
            435                    440                    445
Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His
        450                    455                    460
Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
465                    470                    475


<210> 7
<211> 483
<212> PRT
<213> Artificial Sequence

<220>
<223> Artificial Constructs

<400> 7
Asp Tyr Gln Val Ser Ser Pro Ile Tyr Asp Ile Asn Tyr Tyr Thr Ser
 1                5                    10                   15
Glu Pro Ser Gln Lys Ile Asn Val Lys Gln Ile Ala Ala Arg Leu Leu
            20                   25                   30
Thr Arg Gly Gly Ala Ile Ala Lys Lys Val Val Leu Gly Lys Lys Gly
        35                   40                   45
Asp Thr Val Glu Leu Thr Cys Thr Ala Ser Gln Lys Lys Ser Ile Gln
    50                   55                   60
Phe His Trp Lys Asn Ser Asn Gln Ile Lys Ile Leu Gly Asn Gln Gly
65                   70                   75                   80
Ser Phe Leu Thr Lys Gly Pro Ser Lys Leu Asn Asp Arg Ala Asp Ser
            85                   90                   95
Arg Arg Ser Leu Trp Asp Gln Gly Asn Phe Pro Leu Ile Ile Lys Asn
        100                  105                  110
Leu Lys Ile Glu Asp Ser Asp Thr Tyr Ile Cys Glu Val Glu Asp Gln
        115                  120                  125
Lys Glu Glu Val Gln Leu Leu Val Phe Gly Leu Thr Ala Asn Ser Asp
        130                  135                  140
Thr His Leu Leu Gln Gly Gln Ser Leu Thr Leu Thr Leu Glu Ser Pro
145                  150                  155                  160
Pro Gly Ser Ser Pro Ser Val Gln Cys Arg Ser Pro Arg Gly Lys Asn
            165                  170                  175
Ile Gln Gly Gly Lys Thr Leu Ser Val Ser Gln Leu Glu Leu Gln Asp
        180                  185                  190
Ser Gly Thr Trp Thr Cys Thr Val Leu Gln Asn Gln Lys Lys Val Glu
        195                  200                  205
Phe Lys Ile Asp Ile Val Val Leu Ala Ser Gly Asp Lys Thr His Thr
    210                  215                  220
Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe
```

9

```
                225                     230                     235                     240
Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro
                    245                     250                     255
Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu Val
                260                     265                     270
Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr
                275                     280                     285
Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr Arg Val Val Ser Val
                290                     295                     300
Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys
305                     310                     315                     320
Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser
                325                     330                     335
Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro
                340                     345                     350
Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val
                355                     360                     365
Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly
                370                     375                     380
Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp
385                     390                     395                     400
Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp
                    405                     410                     415
Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His
                420                     425                     430
Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Ala Ser
                435                     440                     445
Ala Asp Tyr Gln Val Ser Ser Pro Ile Tyr Asp Ile Asn Tyr Tyr Thr
                450                     455                     460
Ser Glu Pro Ser Gln Lys Ile Asn Val Lys Gln Ile Ala Ala Arg Leu
465                     470                     475                     480
Leu Ser Arg


<210> 8
<211> 453
<212> PRT
<213> Artificial Sequence

<220>
<223> Artificial Constructs

<400> 8
Arg Ser Thr Arg Gly Gly Ala Ile Ala Lys Lys Val Val Leu Gly Lys
 1               5                   10                  15
Lys Gly Asp Thr Val Glu Leu Thr Cys Thr Ala Ser Gln Lys Lys Ser
                20                  25                  30
Ile Gln Phe His Trp Lys Asn Ser Asn Gln Ile Lys Ile Leu Gly Asn
                35                  40                  45
Gln Gly Ser Phe Leu Thr Lys Gly Pro Ser Lys Leu Asn Asp Arg Ala
    50                  55                  60
Asp Ser Arg Arg Ser Leu Trp Asp Gln Gly Asn Phe Pro Leu Ile Ile
65                  70                  75                  80
Lys Asn Leu Lys Ile Glu Asp Ser Asp Thr Tyr Ile Cys Glu Val Glu
                85                  90                  95
Asp Gln Lys Glu Glu Val Gln Leu Leu Val Phe Gly Leu Thr Ala Asn
```

10

```
                    100                     105                     110
Ser Asp Thr His Leu Leu Gln Gly Gln Ser Leu Thr Leu Thr Leu Glu
        115                     120                     125
Ser Pro Pro Gly Ser Ser Pro Ser Val Gln Cys Arg Ser Pro Arg Gly
        130                     135                     140
Lys Asn Ile Gln Gly Gly Lys Thr Leu Ser Val Ser Gln Leu Glu Leu
145                     150                     155                     160
Gln Asp Ser Gly Thr Trp Thr Cys Thr Val Leu Gln Asn Gln Lys Lys
                165                     170                     175
Val Glu Phe Lys Ile Asp Ile Val Val Leu Ala Ser Gly Asp Lys Thr
                180                     185                     190
His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser
                195                     200                     205
Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg
        210                     215                     220
Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro
225                     230                     235                     240
Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala
                245                     250                     255
Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr Arg Val Val
                260                     265                     270
Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr
                275                     280                     285
Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr
        290                     295                     300
Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu
305                     310                     315                     320
Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser Leu Thr Cys
                325                     330                     335
Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser
                340                     345                     350
Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp
        355                     360                     365
Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser
        370                     375                     380
Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala
385                     390                     395                     400
Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
                405                     410                     415
Ala Ser Ala Asp Tyr Gln Val Ser Ser Pro Ile Tyr Asp Ile Asn Tyr
        420                     425                     430
Tyr Thr Ser Glu Pro Ser Gln Lys Ile Asn Val Lys Gln Ile Ala Ala
        435                     440                     445
Arg Leu Leu Ser Arg
        450
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<211> 446
<212> PRT
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<220>
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<400> 9
Asp Tyr Gln Val Ser Ser Pro Ile Tyr Asp Ile Asn Tyr Tyr Thr Ser

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  1                       5    ·                     10            ·             15
Glu Pro Cys Gln Lys Ile Asn Val Lys Gln Ile Ala Ala Arg Leu Leu
              20                      25                  30
Thr Arg Gly Gly Ala Ile Ala Lys Lys Val Val Leu Gly Lys Lys Gly
              35                      40                  45
Asp Thr Val Glu Leu Thr Cys Thr Ala Ser Gln Lys Lys Ser Ile Gln
          50                      55                  60
Phe His Trp Lys Asn Ser Asn Gln Ile Lys Ile Leu Gly Asn Gln Gly
65                      70                  75                  80
Ser Phe Leu Thr Lys Gly Pro Ser Lys Leu Asn Asp Arg Ala Asp Ser
              85                      90                  95
Arg Arg Ser Leu Trp Asp Gln Gly Asn Phe Pro Leu Ile Ile Lys Asn
              100                     105                 110
Leu Lys Ile Glu Asp Ser Asp Thr Tyr Ile Cys Glu Val Glu Asp Gln
          115                     120                 125
Lys Glu Glu Val Gln Leu Leu Val Phe Gly Leu Thr Ala Asn Ser Asp
      130                     135                 140
Thr His Leu Leu Gln Gly Gln Ser Leu Thr Leu Thr Leu Glu Ser Pro
145                     150                 155                 160
Pro Gly Ser Ser Pro Ser Val Gln Cys Arg Ser Pro Arg Gly Lys Asn
                  165                 170   ·             175
Ile Gln Gly Gly Lys Thr Leu Ser Val Ser Gln Leu Glu Leu Gln Asp
              180                     185                 190
Ser Gly Thr Trp Thr Cys Thr Val Leu Gln Asn Gln Lys Lys Val Glu
              195                     200                 205
Phe Lys Ile Asp Ile Val Val Leu Ala Ser Gly Asp Lys Thr His Thr
      210                     215                 220
Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe
225                     230                 235                 240
Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro
                  245                 250                 255
Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu Val
              260                     265                 270
Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr
              275                     280                 285
Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr Arg Val Val Ser Val
      290                     295                 300
Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys
305                     310                 315                 320
Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser
                  325                 330                 335
Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro
              340             ·       345                 350
Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val
              355                     360                 365
Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly
      370                     375                 380
Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp
385                     390                 395                 400
Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp
                  405                 410                 415
Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His
              420                     425                 430
Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
          435                     440                 445
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<220>
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<400> 10
Glu Pro Lys Ser Cys Asp
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<210> 11
<211> 29
<212> DNA
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<220>
<223> Primer

<400> 11
ttgcgatcgc taagaaagtg gtgctgggc                    29

<210> 12
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 12
aatccggaag ctagcaccac gatgtc                       26

<210> 13
<211> 30
<212> DNA
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<220>
<223> Primer

<400> 13
tccggattcc agaaggcctc cagcatagtc                   30·

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tccggaggcg ccgtcactca gcagacactg ccacatc           37
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<220>
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c                                                                   61

<210> 18
<211> 61
<212> DNA
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<220>
<223> Primer

<400> 18
gcccgcctcc tgacgcgtgg tggagcgatc gctacagtgg aactgacctg tacagcttcc 60
c                                                                   61
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